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Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PHCF-03037	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP2003/008173	International filing date (*day/month/year*) 26 June 2003 (26.06.2003)	Priority date (*day/month/year*) 28 June 2002 (28.06.2002)
International Patent Classification (IPC) or national classification and IPC C30B 29/38, H01L 21/205		
Applicant HITACHI CABLE, LTD.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
15 December 2003 (15.12.2003)	13 April 2004 (13.04.2004)
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP2003/008173

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-12, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the claims:

pages 1-9, 11-14, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages 10, filed with the letter of _____

☒ the drawings:

pages 1-5, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP 03/08173

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	6, 8, 9, 12, 14	YES
	Claims	1-5, 7, 10, 11, 13	NO
Inventive step (IS)	Claims	6, 8, 9, 12, 14	YES
	Claims	1-5, 7, 10, 11, 13	NO
Industrial applicability (IA)	Claims	1-14	YES
	Claims		NO

2. Citations and explanations

Document 1: US 5656832 A (Kabushiki Kaisha Toshiba), 12 August 1997

Document 2: JP 4-12092 A (Sumitomo Electric Ind., Ltd.), 16 January 1992

Claims 1-4

The invention set forth in claims 1-4 lacks novelty in the light of document 2 cited in the international search report.

Document 2 discloses a porous substrate equipped with a porous layer and a conversion layer, wherein the surface of the conversion layer differs from the porous layer below in that only openings with a diameter of approximately 10Å are formed therein. Therefore, the diameters of the openings in the conversion layer that is disposed upon the outermost surface are smaller than the diameters of the openings in the porous layer.

Claim 5

The invention set forth in claim 5 lacks novelty in the light of document 2 cited in the international search report.

Document 2 discloses a feature wherein the porous layer comprises silicon, which is one type of metal.

Claim 6

The invention set forth in claim 6 involves an inventive step in relation to documents 1 and 2 cited in the international search report.

Document 2 does not disclose a feature wherein the porous layer comprises a "metal oxide, a metal nitride or a metal carbide," and even a person skilled in the art could not easily have conceived of this feature in the light of the nitride buffer layer that is disclosed in document 1.

Claim 7

The invention set forth in claim 7 lacks novelty in the light of document 2 cited in the international search report.

Document 2 discloses a feature wherein the porous layer comprises silicon, which is a semiconductor material.

Claim 8

The invention set forth in claim 8 involves an inventive step in relation to documents 1 and 2 cited in the international search report.

Document 2 does not disclose a feature wherein the porous layer comprises a "semiconductor material configured from a Group III nitride-based compound," and even a person skilled in the art could not easily have conceived of this feature in the light of the nitride buffer layer that is disclosed in document 1.

Claim 9

The invention set forth in claim 9 involves an inventive step in relation to documents 1 and 2 cited in the international search report.

Document 2 does not disclose features wherein the conversion layer comprises "TiN or Pt" and the porous layer comprises "GaN," and even a person skilled in the art could not easily have conceived of these features in the light of the nitride buffer layer that is disclosed in document 1.

Claim 10

The invention set forth in claim 10 lacks novelty in the light of document 2 cited in the international search report.

Document 2 discloses a feature wherein the openings in the conversion layer have a diameter of approximately 10Å.

Claim 11

The invention set forth in claim 11 lacks novelty in the light of document 2 cited in the international search report.

Document 2 discloses a feature wherein the thickness of the conversion layer is approximately 0.5μm.

Claims 12 and 14

The invention set forth in claims 12 and 14 involves an inventive step in relation to documents 1 and 2 cited in the international search report.

Documents 1 and 2 do not disclose the feature of adding "thermal processing," and even a person skilled in the art could not easily have conceived of this feature in the light of the anodization method that is disclosed in document 2.

Claim 13

The invention set forth in claim 13 lacks novelty in the light of document 2 cited in the international search

report.

The substrate disclosed in document 2 can be used to form compound semiconductor layers, including GaN-based semiconductor layers.